ABSTRACT

Transistor gate structures, encapsulation structures, and fabrication techniques are provided, in which sidewalls of patterned gate structures are conditioned by nitriding the sidewalls of the gate structure, and a silicon nitride encapsulation layer is formed to protect the conditioned sidewalls during manufacturing processing. The conditioning and encapsulation avoid oxidation of gate stack layers, particularly metal gate layers, and also facilitate repairing or restoring stoichiometry of metal and other gate layers that may be damaged or altered during gate patterning.